What is David Hume's contention regarding causality?

Bezverkhniy Volodymyr Dmytrovych.

Ukraine, e-mail: bezvold@ukr.net

David Hume argued "...that inductive reasoning and belief in causation cannot be justified rationally; instead, they are the result of customs and mental habits..." [1].

Hume was wrong, because he lived a long time ago (1711 - 1776), and was not familiar with Einstein's theory of relativity (Special relativity - 1905, General relativity - 1915 - 1916).

The fact is that causality is a direct consequence of the existence in the Universe of the limiting rate of transmission of interaction (the speed of light in vacuum).

Consequently, the Universe initially has causality, since it is a four-dimensional space-time continuum in which the interval will be only time-like (S^2 > 0), because the speed of light cannot be overcome.

If v < c, then always S > 0.

$$S = L * (1 - v^2 / c^2)^0.5 * c / v$$

It can be said in another way: the Universe has causality, as it consists of massive objects: elementary particles, nuclei, atoms, planets, stars, black holes, galaxies, etc. And massive objects cannot overcome the speed of light in a vacuum.

An interval (S) is the "distance" between two events in real 4-dimensional space-time.

$$S^2 = c^2 * \Delta t^2 - \Delta L^2$$

The length (L) and time (t) in different inertial frames may differ, but the interval will always be constant. The essence of the timelike interval (S^2 > 0) is that there is such a frame of reference in which both events occurred in the same place, but at different times (Δt).

Causality as an integral characteristic of our Universe is considered in more detail at the link [2].

1. David Hume. Wikipedia (ru). https://en.wikipedia.org/wiki/David_Hume
2. Bezverkhniy V. D. Causality as An Integral Characteristic of Our Universe. SSRN Electronic Journal (November 2021). http://dx.doi.org/10.2139/ssrn.3930178